

Dynamic photonic crystals

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The use of dynamic photonic structures open fascinating new possibilities for controlling the properties of light. The general idea is to create a photonic crystal system such that a light pulse can be held in the structure for a sufficiently long time, and to modulate the refractive index of the system while the pulse is in the system. Doing so allows the spectrum of the pulse to be molded almost arbitrarily with small refractive index modulations, leading to highly non-trivial information processing capabilities on chip. As examples of such capabilities, here we show that light pulses can be stopped, stored, and time-reversed with these dynamic systems. [1-4]

[1] M. F. Yanik and S. Fan, "Stopping light all-optically", Physical Review Letters, vol. 92, art. No. 083901 (2004).

[2] M. F. Yanik and S. Fan, "Time reversal of light with linear optics and modulators", Physical Review Letters, vol. 93, art. No. 173903 (2004).

[3] M. F. Yanik, W. Suh, Z. Wang and S. Fan, "Stopping light in a waveguide with an all-optical analogue of electromagnetic induced transparency", Physical Review Letters, vol. 92, art. No. 233903 (2004).

[4] M. F. Yanik, and S. Fan, "Stopping and storing light coherently", Physical Review A, vol. 71, art. No. 013803 (2005).